

ADDITIONAL NOTES ON THE GENUS LIPPIA. VII

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LIPPIA GRACILIS Schau.

Additional bibliography: Moldenke, *Phytologia* 39: 45 & 46. 1978.

Peckolt (1904) records this species from Alagoas, Bahia, and Pernambuco, Brazil, with the vernacular name "chumby". He says of it: "Pflanze mit oval-länglichen, gekerbten, filzigen Blättern und kleinen, weissen Blüten. Blätter von thymianähnlichen Geruch, als Tee und Sirup bei Lungen- und Bronchialkatarrh Gilt beim Volke als Spezifikum bei Keuchhusten".

The type collection of this species was made by Martius "in camporum sepibus ad Joazeiro, Apr.", in Bahia, Brazil, and is deposited in the Munich herbarium. The handwritten label and Schauer (1847) give "Bahia et Pernambuco" as the locality of collection, so the collection may well consist of material from two separate localities. The printed labels accompanying Lützelsburg 1466 in the Munich herbarium indicate "Piauy" as the state in which the collection was made, but in ink is inscribed "Matto Grosso". The printed word is not crossed out, but I assume that the inked in words are the more reliable and that the material actually came from Matto Grosso.

Material of L. gracilis has been misidentified and distributed in some herbaria as L. microphylla Cham. On the other hand, the Irwin, Maxwell, & Wasshausen 19579, distributed as L. gracilis, actually represents L. glandulosa Schau., while Anderson, Stieber, & Kirkbride 35371 is the type collection of L. pohliana var. longibracteolata Moldenke.

Additional citations: BRAZIL: Bahia: Davidse, Ramamoorthy, & Vital 11763 (Ld, N, N), 11963 (Ld), 12070 (Z); Harley, Renvoize, Erskine, Brighton, & Pinheiro in Harley 15158 (Ld), 16269 (Gz), 16390 (Ld), 16444 (Tu); Irwin, Grear, Souza, & Reis dos Santos 14786 (Ld, N), 14925 (Ac, N); Martius s.n. [in camporum sepibus ad Joazeiro, Apr.; Macbride photos 20325] (Mu—43—type, Z—iso-type). Espirito Santo: W. Hoehne 5549 (N). Goiás: G. Gardner 4332 (M). Maranhão: Eiten & Eiten 4492 (N, W—2445202), 10807 (N, W—2757760). Mato Grosso: Lützelsburg 1466 (Mu, Mu, Z). Pernambuco: Kubitzki 71-88 (Mu).

LIPPIA GRANDIFLORA Mart. & Schau.

Additional synonymy: Eriope horridula Epling in Fedde, Repert. Spec. Nov. Beih. 85: 191. 1936.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 266. 1858; Moldenke, *Phytologia* 13: 354. 1966; Moldenke, Fifth Summ. 1: 155 (1971) and 2: 555 & 891. 1971; Harley, Kew Bull. 28: 121—122. 1973; M. Gilbert, Biol. Abstr. 57: 4423. 1974; Moldenke, *Phytolo-*

gia 28: 457 (1974) and 39: 43. 1978.

Recent collectors comment on the fact that this species produces a definite xylopodium. Irwin and his associates describe it as "sessile, leafless from [a] thick woody root, to 5 cm. tall". The corollas are said to have been "rose" on Hatschbach & Kummrow 37130, "deep-rose" on Hatschbach & Kummrow 34929, "dark-lilac" on Hatschbach 39118, and "light lavender-violet, throat yellow" on Irwin & al. 8171. It has been found growing in cerrado, burned-over cerrado, and "campo limpo", while Hatschbach encountered it on "cerrado recém queimado". It has been found growing at 975 meters altitude, flowering in September and October, and fruiting in September.

According to Harley (1973), Epling (1936) cites Burchell 7921, 7922, 8291, 8426-5 (the type collection), and 8746-2 and Glaziou 21947 as representing Eriope horridula Epling. He comments: "As in many species of Eriope, the stems and leaves of E. horridula bear long spreading setae. A microscopic examination of these reveal[s] that while those of other Eriope species are multicellular, as in most other Labiatae, those of E. horridula appear to be unicellular and quite different in structure. The latter closely resemble the setose hairs of some Lippia species, especially L. grandiflora Mart. & Schauer and L. lasiocalycina Cham. All except one of the collections cites under E. horridula closely match the type in general appearance and share with it the unicellular setose hairs. The exception is Burchell 7922, which possesses typical multicellular setae and in other respects also seems to be merely a depauperate, sterile specimen of Eriope crassipes Benth.

"An examination of herbarium material of Lippia at Kew produced a specimen from Goiás, Glaziou 21892, which shows striking resemblance in its sterile shoots to those of Eriope horridula. The sheet contains four specimens, two sterile shoots, and two fertile plants which bear typical heads of Lippia flowers and small leaves quite different from those on the sterile stems. The plant seems to be a precocious flowering species in which the mature shoots are developed late. This gathering has been cited tentatively by Moldenke in his monograph of Lippia as Lippia grandiflora, though there is no evidence that he actually examined the Kew sheet. More recently, however, in 1967, the same sheet has been annotated as this species by Troncoso, who is currently working on S. American members of this genus.

"While there seems no doubt that Eriope horridula is, in fact, a species of Lippia, and that the sterile shoots of Glaziou 21892 belong to the same species, there still seems room for doubt that this species is L. grandiflora or even that the Glaziou gathering is not a mixed one. All other collections referred to this species, including the type, consist only of fertile material, bearing few, small, ovate leaves with crenate-serrate teeth and dense-

ly hairy on both surfaces. The leaves of Eriope horridula and of the sterile shoots of Glaziou 21892 are several times longer, narrowly elliptic to linear with salient teeth and glabrous, except for a few scattered setae and numerous sessile glands. They are not unlike the leaves on some specimens at Kew determined as L. lasiocalycina. Material of this species at Kew is very heterogeneous, and some sort of taxonomic revision is obviously needed. Most specimens suggest a much taller more shrubby plant than L. grandiflora, flowering at some height above the ground, though a sheet determined as this by Moldenke suggests that precocious flowering at ground level is possible. The ability to flower almost at ground level, usually as a response to frequent burning, is common to many cerrado species in Brazil, and as it may result in modification to various vegetative characters taxonomic confusion sometimes occurs. It seems possible that this may have happened here."

The Lützelburg 388 & 1360, distributed as L. grandiflora, actually are L. francensis Moldenke, Irwin, Souza, & Reis dos Santos 7900 is L. lepida Moldenke, while Irwin, Souza, & Reis dos Santos 8577, Lützelburg 1465a, and Maguire, Murça Pires, Maguire, & Silva 56346 are L. primulina var. goyazensis S. Moore.

Additional citations: BRAZIL: Distrito Federal: Irwin, Souza, & Reis dos Santos 8171 (Ac, N). Goiás: Hatschbach 39118 (Z). Minas Gerais: Hatschbach & Kummrow 34929 (Ld), 37130 (Z); Martius 1571 [Macbride photos 20326] (Mu—type, Z—isotype).

LIPPIA GRANDIFOLIA Hochst.

Additional & emended synonymy: Lippia adoensis R. E. Fr. apud Robyns, Fl. Sperm. Parc Nat. Albert 2: 138, in syn. 1947 [not L. adoensis Hochst., 1845, nor L. adoënsis Hochst., 1841, nor "sensu Hutch. & Dalz.", 1963]. Lippia grandifolia "Hochst. ex A. Rich." apud Snowden, Grass Comm. & Mtn. Veg. Uganda 94. 1953.

Additional bibliography: Schau. in A. DC., Prodr. 11: 579. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 266. 1858; J. G. Baker in Thiseitl-Dyer, Fl. Trop. Afr. 5: 278 & 280—281. 1900; Almagia in Pirotta, Fl. Col. Erit. [Ann. Inst. Bot. Roma 8:] 132—133. 1903; Snowden, Grass Comm. & Mtn. Veg. Uganda 20, 54, & 94. 1953; Dale & Greenway, Kenya Trees 588. 1961; Lind & Tallantire, Some Com. Flow. Pl. Uganda, ed. 1, 146, 147, 243, 254, 257, & 258. 1962; Moldenke, Phytologia 14: 406—407. 1967; Moldenke, Résumé Suppl. 16: 8. 1968; Drar, Publ. Cairo Univ. Herb. 3: 110. 1970; Lind & Tallantire, Some Com. Flow. Pl. Uganda, ed. 2, 146, 147, 243, 254, 257, & 258. 1971; Moldenke, Fifth Summ. 1: 211, 213, 230, 233, & 234 (1971) and 2: 549 & 891. 1971; Lewalle, Bull. Jard. Nat. Belg. 42 [Trav. Univ. Off. Bujumb. Fac. Sci. C.20]: [231]. 1972; Moldenke, Phytologia 23: 421 & 433 (1972) and 38: 263 & 266. 1978.

Recent collectors describe this plant as a subshrub, 1—1.75 m. tall, of strict habit, mostly unbranched at base, the leaves aro-

matic when crushed, and have found it growing on savannas at 1000-1800 m. altitude, flowering in January and May, fruiting in January. Snowden encountered it in Cymbopogon afronardus grassland on exposed and stony slopes and in Hypparrhenia cymbaria grassland with good humus in Uganda. The corollas are said to have been "white" on Meyer 7900 and "yellowish-green" on Ofermain 6951. Vernacular names recorded for it are "olugumaguma", "omushara-nkanda", and "omuzira-kironda". On Lewalle 620 there is a notation: "fls. blanches à coeur jaune, entomophiles".

Lind & Tallantire (1962) describe this plant as "A woody herb or small shrub up to 1.8 m. high. Stem slightly rough. Leaves in groups of three or four, smelling. Flowers white, with a yellow throat, in dense, stalked, rounded to elongated heads, three to five or more heads in the axils of each whorl of leaves. Fruit not fleshy. Grassland."

Almagia (1903) says of "T. P. n. 1851", which he calls "Lippia sp. nova?": "L'esemplare da me esaminato si avvicinerrebbe, par avere i capolini subsessili, alla Lippia grandifolia....che con Richard.....ritengo veramente diversa dalla Lippia adoënsis,.... con cui la fa sinonimo Schauer.....Differisce però dall'una e dall'altra: dalla L. adoënsis per le foglie più grandi, per i capolini quasi sessili e compatti e per le foglie ascellanti di essi, più piccole delle ordinarie; dalla L. grandifolia per essere i capolini non disposti in una specie di lunga spiga icontani tra loro e quasi prive di foglie ascellanti".

The second edition of Lind & Tallantire (1971) is sometimes cited with "1972" as the publication date, but on what basis is not obvious to me. The L. adoënsis sensu Hutch. & Dalz., referred to above, is a synonym of L. savoryi Meikle.

Lewalle (1972) cites his no. 620 from Burundi. Drar (1970) cites Drar & Mahdi 1232, 1690, & 1821 from Bahr al Ghazal, Sudan, but their no. 1821 is not verbenaceous. Tanner R.T. 4032, distributed as L. grandifolia, is L. abyssinica (Otto & Dietr.) Cuf.

Additional citations: SUDAN: Bahr al Ghazal: Drar & Mahdi 1232 (Gz), 1690 (Gz). ETHIOPIA: F. G. Meyer 7900 (W-2520112); Schim-per 734 (Mu-2-isotype). ZAIRE: Ofermain 6951 (Mu). BURUNDI: Lewalle 620 (Z), 2361 (Ac).

LIPPIA GRANDIFOLIA var. ANGUSTISPICATA Moldenke

Additional bibliography: Moldenke, *Phytologia* 12: 177. 1965; Moldenke, *Fifth Summ.* 1: 230 (1971) and 2: 891. 1971.

LIPPIA GRANDIFOLIA var. LONGIPEDUNCULATA Moldenke

Additional bibliography: Moldenke, *Phytologia* 12: 177-178. 1965; Moldenke, *Fifth Summ.* 1: 230 & 234 (1971) and 2: 891. 1971.

LIPPIA GRATA Schau.

Additional bibliography: Buek, *Gen. Spec. Syn. Candoll.* 3: 266.

1858; Moldenke, *Phytologia* 13: 354. 1966; Moldenke, Fifth Summ. 1: 156 (1971) and 2: 891. 1971.

Pereira describes this plant as a shrub, 2 m. tall, with white flowers, and found it in flower in January.

Material of this species has been misidentified and distributed in some herbaria as L. salviaefolia Cham.

Additional citations: BRAZIL: Bahia: Martius s.n. [Villa Novo da Rainho; Macbride photos 20327] (Mu—45—type, Z—-isotype); E. Pereira 9765 [Pabst 8654; Herb. Brad. 35121] (Mu, Mu, N).

LIPPIA GRAVEOLENS H.B.K., Nov. Gen. & Sp. Pl., ed. folio, 2: 215—216. 1817.

Additional & emended synonymy: Lippia tomentosa Sessé & Moc. ex Moldenke, Prelim. Alph. List Inv. Names 32, in syn. 1940 [not L. tomentosa L. f., 1975]. Lantana graveolens Crutchfield & Johnston ex Moldenke, *Phytologia* 13: 354, in syn. 1966. Lippia berlandieria Schau. apud Uphof, Dict. Econ. Pl., ed. 2, 315, sphalm. 1968. Lippia berlandieri Schlecht. ex Marroquin, Cuad. Inst. Invest. Cient. 14: 56. 1968. Goniostachyum graveolens Small apud Gibson, Fieldiana Bot. 24 (9): 211, in syn. 1970. Lippica graveolens R. F. Sm. ex Moldenke, Fifth Summ. 2: 568, in syn. 1971. Lippia graveolens (H.B.K.) Small ex Moldenke, Fifth Summ. 1: 555, in syn. 1971. Lippia berlandieri DC. ex Moldenke, *Phytologia* 34: 275, in syn. 1976. Lantana graveoleus Crutchfield & Johnston ex Moldenke, *Phytologia* 36: 43, in syn. 1977.

Additional & emended bibliography: H.B.K., Nov. Gen. & Sp. Pl., ed. folio, 2: 215—216 (1817) and ed. quarto, 2: 266—267. 1818; Schau., *Linnaea* 20: 479. 1847; Schau. in A. DC., Prodr. 11: 575—576 & 608. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 253, 265, & 266. 1858; S. Wats., Proc. Am. Acad. 24: 67. 1889; Barnhart, Bull. Torrey Bot. Club 29: 590. 1902; Loes., Verh. Bot. Ver. Brand. 53 [Abhandl. 241]: 76—77. 1912; Roys, Ethno-bot. Maya [Tulane Univ. Mid. Am. Res. Ser. Publ. 2:] 214 & 322. 1931; M. Martínez, Pl. Medic. Mex., ed. 1, 296, 428, & 621. 1933; Parks, Tex. Agr. Exp. Sta. Bull. 155: 111. 1937; M. Martínez, Pl. Medic. Mex., ed. 2, 304, 429, & 608 (1939) and ed. 4. 1959; Hocking, Excerpt. Bot. A. 10: 271 (1966), A.11: 103 (1967), and A.12: 423. 1967; P. Gray, Dict. Biol. Sci. 365. 1967; Grieve, Modern Herb. 486. 1967; Moldenke, *Phytologia* 14: 403 & 407. 1967; Puig, Bull. Soc. Hist. Nat. Toulouse 103: 310. 1967; Burlage, Ind. Pl. Tex. 183, 199, 230, & 242. 1968; Marroquin, Cuad. Inst. Invest. Cient. 14: 56. 1968; J. F. Morton, Econ. Bot. 22: 97. 1968; Uphof, Dict. Econ. Pl., ed. 2, 315. 1968; M. Martínez, Pl. Medic. Mex., ed. 5, 464 & 639. 1969; Rickett, Wild Fls. U. S. 3 (2): 366. 1969; Rosengarten, Book Spices 276 & 278. 1969; Stahl, Skarzynski, & Voelker, Journ. Assoc. Offic. Anal. Chem. 52: 1184—1189. 1969; G. W. Thomas, Tex. Pl. Ecol. Summ. 77. 1969; Anon., Biol. Abstr. 51: 8675. 1970; Correll & Johnston, Man. Vasc. Pl. Tec. [Contrib. Tex. Res. Found. Bot. 6:] 1834, 1841, 1849, 1862, & 1873. 1970; El-Gazzar & Wats.,

New Phytol. 69: 483 & 485. 1970; Gibson, Fieldiana Bot. 24 (9): 207 & 211. 1970; Moldenke in Correll & Johnston, Man. Vasc. Pl. Tex. [Contrib. Tex. Res. Found. Bot. 6:] 1330 & 1331. 1970; Mahler, Key Vasc. Pl. Black Gap, ed. 3, 69. 1971; Moldenke, Fifth Summ. 1: 55, 61, 72, 77, 80, 83, 86, 88, & 366 (1971) and 2: 525, 527, 539, 542, 550, 551, 554—556, 566—568, & 891. 1971; Farnsworth, Pharmacog. Titles 7 (10): ix. 1972; Fong, Trajánkova, Trojánek, & Farnsworth, Lloydia 39: 147. 1972; Heath, Trop. Sci. 14: 251. 1972; Moldenke, Phytologia 23: 432. 1972; El-Gazzar, Egypt. Journ. Bot. 17: 75 & 78. 1974; Moldenke, Phytologia 28: 432 (1974) and 31: 378. 1975; [Farnsworth], Pharmacog. Titles 7, Cum. Gen. Ind. [72]. 1975; Hinton & Rzedowski, Anal. Esc. Nac. Cienc. Biol. 21: 75. 1975; Moldenke, Phytologia 34: 252 & 275 (1976), 36: 43 (1977), 38: 386, 390, 396, & 398 (1978), and 39: 24. 1978.

Additional illustrations: M. Martínez, Pl. Medic. Mex., ed. 1, 429 [as L. origanoides] (1933), ed. 2, 429 (1939), and ed. 5, 464. 1969; Rosengarten, Book Spices 278. 1969.

Recent collectors describe this plant as a perennial herb, bush, or small shrub, 0.7—3 m. tall, "1 foot wide", slender, erect, strong-scented or aromatic with a mint-like odor, the leaves light-green above, gray-green beneath, aromatic with a cinnamon-like odor, the flowers showy, very fragrant, the calyx light-yellow (Lord & McComas 621), and the anthers yellow. They have found it growing in sandy loam, fine sandy silt, gravel, or gravelly soil, in rocky clay soil, on yellowish sandstone, and on limestones hills and mesas, as well as in brush-lands, deserts, gullies, heavy loam in sunlight, shrubby secondgrowth, and adjacent to "milpas", along arroyos and rocky clay roadsides, in arid to semi-arid thorn forests on low hills, in thin soil on arid slopes on a rocky substrate, on rocky clay banks, steep hillsides and bluffs, in massive caliche-base on dry gravelly hills, in desert washes, rocky limestone loam of disturbed areas, xerophilous matorral, rough desolate limestone country, and deciduous tropical woods. They have also reported it from hillsides, dry rocky hillsides, the banks of rocky open canyons, pine forests, grassy hills, the foot of exposed gypsum faces, and heavily eroded hills of a loose limey soil covered with Acacia-mesquite grassland, as well as among low spiny vegetation and in thick underbrush woodland associated with oak, pine, and juniper and in semi-arid areas with steep slopes in rolling hills or thorn scrub and oaks.

Johnston found the species growing among "broken rock along [a] dike through tuff-flats", while Johnston & Muller report it "not common on banks of rocky open canyons", but "frequent about limestone ledges on hillsides" and "on arid limestone ledges with Hechtia". Tharp & Johnston encountered it "on ridges of calichified fine sandy loam in short-brush with much guajillo and black-brush". Messer avers that it "grows well in disturbed areas of high elevation on semi-arid foothills with vegetation of cacti, shrubs, and small trees". McVaugh found it "abundant among shrubs in deep ravines, desert flats, and steep eroded slopes with

Larrea, Fouquieria, Opuntia, Karwinskia, and Prosopis". Blassingame and his associates encountered it "on canyon walls and floors in limestone, shale, and sandy wash", the Davidsees "on limestone rock outcrops with low shrubs and Yucca", and Webster and his associates "in woods of Acacia, Quercus, Garrya, Juniperus, etc. on limestone hills.

The Dunns found L. graveolens growing "with numerous species of Bursera, Bombax, Ceiba, Ipomoea trees, and Opuntia on very rocky limestone slopes"; Molina reports it "frequent", "common", or "abundant in arid scrub forests"; Hernández & Cadillot also report it "abundant". Johnston & Muller refer to it as "common" in Coahuila, but "not common" on the Coahuila-Chihuahua border. Webster and his associates encountered it in "semi-evergreen thorn-scrub of Acacia, Agave, Bursera, Sabal, etc. on limestone slopes"; Mears found it growing with Acacia, Opuntia, and Yucca, while Chiang and his associates met with it "on rhyolite hill-sides badly overbrowsed by goats in thin, dark, sandy, and grassy soil derived from igneous rocks with Agave lecheguilla, Mimosa, etc."

González Quintero reports the species from "mezquital alterado", desert matorral with Flourensia resinosa, matorral of Bursera and Plumeria, and "ladera de roca cristalina" with matorral vegetation of Prosopis, Myrtillocactus, Agave, Opuntia, and Eysenhardtia. Rzedowski found it on "slopes of igneous rock with secondary pastizal vegetation surrounded by deciduous tropical forest", in tropical deciduous forests "sobre ladera caliza", on "ladera caliza con vegetación de bosque abierto de Quercus, Pinus y Bursera" or "con Helietta parvifolia" or on "ladera riolítica con vegetación de encinar con Ceiba, Dodonaea y gramíneas". He reports it scarce in Guerrero. Runyon found it "infrequent" in Brewster County, Texas, but "common on gravel-hills" in Starr County.

Henrickson reports the species "common in limestone alluvial plain with Agave, Cordia, Larrea, Eysenhardtia, Jatropha, Buddleia, etc.", "infrequent along margins of arroyos in sandy clay soil with Larrea, Acacia, Prosopis, Parthenium, Bahia, Hilaria, Opuntia, etc.", "infrequent in open Chihuahuan Desert scrub in small arroyos with Larrea, Flourensia, Acacia, Jatropha, Grusonia, Fouquieria, Cordia, etc.", "in open Chihuahuan Desert with rocky reddish soil with Larrea, Acacia, Flourensia, Buddleia, Opuntia, Jatropha, and numerous annuals", "frequent along roads on canyon sides with Larrea, Acacia berlandieri, Hechtia, Viguiera, Yucca, Cordia, Croton, etc.", "frequent on west-facing shale slopes with Larrea, Selinocarpus, Grusonia, Agave lecheguilla, Tecoma, etc.", "infrequent in limestone canyons in Tamaulepian-like scrub with Quercus, Rhus, Prunus, Cercocarpus, Ceanothus, etc.", "at springs in limestone cliffs with Celtis, Dasyllirion, Acacia berlandieri & other species, Larrea, Buddleia, etc.", "on

flats near slopes of northeast-facing limestone cliffs with Celtis, Larrea, Acacia, Prosopis, Fouquieria, Hechtia, Agave, Bursera, Leucophyllum, etc.", "on sandy alluvial plains with Larrea, Acacia, Jatropha, Agave, Fouquieria, Opuntia, etc.", "on rocky slopes with Agave, Prosopis, Fouquieria, Acacia, Cassia, Mimosa, etc.", "on rocky limestone alluvial slopes with Larrea, Cordia, Agave, Fouquieria, Jatropha, Opuntia, etc.", "on steep south-facing slopes in reddish sandstone clay soil with Hechtia, Agave, Parthenium, Viguiera, etc.", and "on limestone outcroppings with Agave, Buddleia, Croton, Dasyllirion, Opuntia, etc." Stevens and his associates report it "common in desert scrub on calcareous ridges". Torke and his associates report finding it in areas of "thorn scrub with columnar cacti, steep slopes, and very rocky soils".

Recent collectors have found Lippia graveolens growing at altitudes of 60—2000 meters, flowering in February and from April to December, fruiting from May to December. The corollas are said to have been "white" on Breedlove 27656, Harmon & Dwyer 4199, Henrickson 5930, 5991, 6085, 6217, 6521, 7768, 13060, & 13399, Hinton 13061, Johnston, Tharp, & Turner 3509, McKee 11001, Messer 72/37, Molina R. 13202, 22727, 22829, & 23211, Rollins & Tryon 5888, Runyon 154, Rzedowski 22676, and Webster & al. 12909, "off-white" on Stevens, Donaghue, & Scott 2531, "creamy-white" on Correll & Correll 35330, "cream" or Herald & Clark 429, McVaugh 26479, and War-nock & Turner 8302, "creamy-white with yellow eye" on Lundell & Lundell 12340, "yellowish-white" on Webster & al. 11443, "pale yellowish-white with a dark-yellow center" on Davidse & Davidse 9304, "ochroleucous" on Johnston 8242, "yellowish" on Johnston & Muller 772 & 8801 and Rzedowski 12079 & 29861, and "yellow" on Moncayo 60, Stanford & al. 96, and Rzedowski 4533.

Common and vernacular names recently reported for the species are "akil-che [=vine-like tree] in Mayan, but in Mayan texts it is always listed by its Spanish name, 'orégano', "hierba dulce", "majorana de campo", "Mexican sage", "oreganillo", "oregano", "red brush", "red-brush", "red-bush", "salve blanco", "salvia", "scented lippia", "té de pais", "té del Paris", and "yerba dulce". According to Molina R. this is the "Mexican oregano" of Aruba. Stahl and his associates (1969) differentiate two common types of commercial "orégano" by gas chromatography and thin-layer chromatography — they found Greek orégano to have 7:1 concentration of carvacol to thymol, while Mexican orégano has a concentration of 1:1. Heath (1972) confirms the presence of carvacol and thymol. Lundell reports that L. graveolens is a medicinal herb in San Luis Potosí, while Messer reports the same from Oaxaca, where it is cooked to prepare a cure for stomach-ache. Grieve (1967) asserts that in Mexico its medicinal use is similar to that of Phylla scaberrima (A. L. Juss.) Moldenke.

Gibson (1970) asserts that Lippia graveolens inhabits "Rocky slopes or damp thickets on plains, 350 meters or less" in El Petén

and Zacapa, Guatemala, and gives its further distribution as "Southern Texas; Mexico; Nicaragua". She notes that "The aromatic leaves, either fresh or dried, are used in Central America for flavoring food, and the dry leaves are often sold in the markets".

Parks (1937) describes the species as "A slender-growing bush reaching a height of three feet or more. It is found only along the Rio Grande River [in Texas]", but will probably grow in other southern portions of the state. "Throughout the year it is covered with small green leaves and bears in early spring and again after rains small spikes of small lavender-colored flowers which make this plant a very desirable ornamental. The plant will do best as a low hedge or as a group of specimen plants. It has no thorns. It is easily transplanted because of a shallow root system. It should be used in roadside and park work throughout the sections [of Texas] where it will grow."

Uphof (1968) reports that in Mexico it is used in native medicine as a stimulant, emmenagogue, and demulcent, and, especially in Yucatán, as a tonic and expectorant. Martínez (1969), listing the plant as "Lippia Berlandieri Schauer", says "Existe de Coahuila a Tamaulipas, Veracruz, Oaxaca y Sinaloa. En Puebla se llama también salvia; en Guerrero, canelilla. Generalmente se usa como condimento especialmente para el pozole. La medicina popular lo usa como estimulante emenagogo y demulcente. En Teloloapan, Gro., usan el cocimiento 'contra el dolor de estómago' y la diarrea; la infusión alcohólica en fricciones 'contra ataques'". The illustration accompanying this discussion by Martínez, unfortunately, is of L. alba (Mill.) N. E. Br., so there is justifiable doubt as to which species his statements really apply.

Loesener (1912) cites Seler & Seler 1053 & 1092 from Nuevo León and 1391 from Oaxaca as "L. Berlandieri Schauer" and 3043 from Chiapas as "L. Berlandieri Schauer forma", commenting that "In Bezug auf Behaarung, Blattgrösse und Blattform, ferner auch in Bezug auf dichtere oder weitere Verteilung der Drüsen und auf die verschiedene Länge der Pedicelli und Grösse der Blüten scheint die Art doch recht veränderlich zu sein und in einigen Formen sich der L. graveolens H.B.K. so zu nähern, dass es fraglich ist, ob sie nicht bloß als eine Varietät dieser älteren Species aufrecht zu erhalten ist".

It may be noted here that the Webster, Miller, & Miller 12909 collection, cited below, has leaves that are very white-tomentose beneath even when mature and is thus anomalous; Mears & Mears 2631 is also not typical L. graveolens.

Rickett (1969) distinguishes L. alba from L. graveolens as follows: L. alba - "5 feet tall, with ovate, toothed leaves, and small purple, pink, or white flowers in heads"; L. graveolens - "up to 8 feet tall, with ovate or elliptic, scalloped leaves, and yellowish or white flowers in heads".

Pollen samples have been taken from Martínez & Trevino 30 and are deposited in the Palynological Reference Collection of the University of Texas herbarium.

It should also be noted here that the revised H.B.K. reference dates given above have been authenticated by Barnhart (1902). In Martínez's 1969 work the index lists this species for page "460", apparently in error.

Marroquin (1968) cites "Hernandez Corzo, Bouquet, & Barkley hlm (FcB. 1719 & 1720)" from Nuevo León, Mexico. González Quintero 2504 is a mixture of Lippia graveolens and Lantana velutina Mart. & Gal.

Material of Lippia graveolens has been misidentified and distributed in some herbaria as L. alba (Mill.) N. E. Br., L. mutans Robinson & Greenm., Lantana sp., Lantana involucrata L., and Salvia sp. On the other hand, the Bourgeau 2983, distributed as Lippia graveolens, actually is L. myriocephala var. hypoleia (Briq.) Moldenke, Debeaux 87 is L. organoides H.B.K., Escalante 14 and Tharp 5904 are Lantana macropoda Torr., Taylor & Taylor 11692 is Lantana trifolia L., and H. Hernández s.n. [12/VII/1965] is Lantana velutina Mart. & Gal.

Additional citations: TEXAS: Brewster Co.: Blossingame, Rowell, & Stanford 1811 (Lk); Correll & Correll 35330 (Ld); Warnock & Turner 8302 [2500] (Au—121187). Cameron Co.: Fleetwood 8144 (Au—243034). Hidalgo Co.: W. F. Blair 48-420 (Au—121176); L. I. Davis s.n. [Oct. 21, 1945] (Au—171997); Lundell & Lundell 9807 (Ld), 9906 (Ld); Tharp & York 51-252 (Au—121180, B1—87441). Jim Hogg Co.: Tharp s.n. [9 Oct. 1958] (Au—164542, Ln—166040). Starr Co.: Gongora, Anda, & McCart 8471 in part (Au—236374, Ld, Lk); R. Runyon 154 (Au—269656); Tharp & Johnston 541907 (Au—121188). Val Verde Co.: Flyer 821 (Au—280778), 858 (Au—280767); L. Johnston 10 (Au—167587); Mears & Mears 2631 (Au—297560, Au—297561); Rowell & Blossingame 15616 (Sl); Seigler & Payne 1959 (Au—285744). Webb Co.: Gongora, Anda, & McCart 8471 in part (Tu—156485); Johnston, Tharp, & Turner 3509 (Au—121189); Martínez & Trevino 30 (Au—222228). Zapata Co.: Cory 35926 (Au—121177); M. de J. Solis 13 (Au—233344). MEXICO: Chiapas: Breedlove 27656 (N); Breedlove & Raven 13177 (Ld); F. Miranda 5062 (W—2508293); Webster, Miller, & Miller 12909 (E—1982093, Ld, M1). Chihuahua: Henrickson 5930 (Ld), 7768 (Ld); Johnston & Muller 1171 (M1); R. M. Stewart 880 (Au—299573). Coahuila: E. T. Arnold 95 (Te—67975); Chiang, Wendt, & Johnston 8273a (Ld); Cole, Minckley, & Pinkava 3600 (Te—66744), 3912 (Te—66743), 4252 (Te—66747); Henrickson 5991 (Ld), 6035 (Ld), 6085 (Ld), 6217 (Ld), 7840 (Ld), 11840b (Ld), 12182 (Ld), 13060 (Ld); I. M. Johnston 8242 (Au—300032), 8801 (Au—301590); Johnston & Muller 772 (Au—302091, M1), 836 (Au—302160, M1), 1171 (Au—300591); Lehto, Keil, & Pinkava 5202 (Te—66746), 5657 (Te—66745), 5673 (Ld, N, Te—66742); E. Marsh 418 (Au—212275); Edw.

Palmer 1025 (Ms--30909), 1026 (Ms--30911); Stanford, Retherford, & Northcraft 96 (Tu--120211); Tuttle 471 (Tu--187699). Durango: Henrickson 12381 (Ld). Guerrero: Halbinger s.n. [4.XI.1967] (Ip); Herald & Clark 429 (Ca--1285638); Lord & McComas 621 (Ca--1285616, Ip); J. Rzedowski 22676 (Ip, Ld, Mi, Ws), 29861 (Mi, Sd--89699, W--2703595). Hidalgo: Gilly & Camp 20 (Ln--199027, N); González Quintero 2504 in part (Ip), 2665 (Ip, Mi), 2745 (Ip, Ld, Mi), 2902 (Ip), 3037 (Ip, Mi), 3585 (Ip, Mi); Lundell & Lundell 12340 (Au--280307); Moncayo 42 (Ip); J. Rzedowski 12079 (Ip). Jalisco: J. Rzedowski 17557 (Au--243591). Michoacán: Hinton 13061 (Se--106854, Tu--112023). Nuevo León: Castano 19 (Au--232670); O. M. Clark 6641 (E--1287872); Kruckeberg 4807 (Se--217605); C. L. Lundell 5697 (Tu--119010); Pringle 1934 (Ms--30910, Mu--3876, Mu--3877); Rollins & Tryon 5810 (Au--300214), 5888 (Au--300188); Roybal 1093 (W--2631135); R. F. Smith M.638 (Au--209676). Oaxaca: Andrieux 166 (Mu--14); Cruz Cisneros 2571 (Au--303687, Mi); Kenoyer 1511 (Au--121162); Liebmann 11249 (Ba); MacDougall s.n. [Nov. 7, 1970] (Ld, N); McKee 11001 (W--2614422); Messer 72/37 (Mi), 165 (Mi); Pringle 6258 (Ms--30867, Mu--1818); Rowell, Webster, & Barkley 17M490 (Au--170142); Stevens, Donoghue, & Scott 2531 (Ld); Torke, Dunn, & LeDoux 410 (Ld, N); Wallace, Dunn, & LeDoux 463 (N). Puebla: Davidse & Davidse 9304 (Ld); Dunn & Dunn 18750 (N, W--2705512); Hernández M. & Cedillo T. 701 (Mi); Moncayo 60 (Ip); J. Rzedowski 20480 (Ip); Webster, Miller, & Miller 11443 (Au--262653). Querétaro: R. McVaugh 26479 (Mi). San Luis Potosí: Henrickson 6521 (Ld); C. L. Lundell 5427 (Tu--119011); J. Rzedowski 4533 (Ip), 6479 (Ip), 6686 (Ba). Sinaloa: H. S. Gentry 14286 (Ld), 14426 (Ld); K. Reiche 386 (Mu). Tamaulipas: Dunn, Harmon, & Walker 17590 (N); Stanford, Lauber, & Taylor 2226 (Se--149146). Zacatecas: Henrickson 6379 (Ld), 13399 (Ld); Lloyd 97 (E--206151); Taylor & Taylor 6086 (N). State undetermined: Gregg s.n. [N. Cap.] (E--116655), s.n. [Majorana de campo] (E--116654). GUATEMALA: Baja Verapaz: Harmon & Dwyer 4199 (W--2705462). HONDURAS: Choluteca: Molina R. 23211 (Ws). Comayagua: Molina R. & Molina 22727 (N). El Paraíso: Molina R. 13202 (W--2735742). Morazán: Molina R. & Molina 22829 (N).

LIPPIA GRISEA Moldenke, Phytologia 20: 242. 1970.

Synonymy: Liorea grisea Anon., Biol. Abstr. 52 (2): B.A.S.I.C. S.135, sphalm. 1971.

Bibliography: Moldenke, Phytologia 20: 242. 1970; Anon., Biol. Abstr. 52 (2): B.A.S.I.C. S.135. 1971; Moldenke, Biol. Abstr. 52: 714. 1971; Moldenke, Excerpt. Bot. A.18: 445. 1971; Moldenke, Fifth Summ. 1: 156 (1971) and 2: 891. 1971; Heslop-Harrison, Ind. Kew. Suppl. 15: 80. 1974.

Citations: BRAZIL: Distrito Federal: Irwin & Soderstrom 5595 (N—isotype, W—2709910—isotype, Z--type).

LIPPIA GRISEBACHIANA Moldenke

Additional bibliography: Hieron., Bol. Acad. Nac. Cienc. Córdoba 4: [Sert. Sanjuan.] 405—406. 1881; Briq. in Chod. & Wilczek, Bull. Herb. Boiss., ser. 2, 2: 544. 1902; Troncoso in Böcher, Hjerting, & Rahn, Dansk Bot. Arkiv 22: 108. 1963; Moldenke, Phytologia 13: 355. 1966; Hocking, Excerpt. Bot. A.11: 103. 1967; Moldenke, Fifth Summ. 1: 198 (1971) and 2: 551, 558, 559, & 891. 1971; Altschul, Drugs & Foods 244. 1973; Troncoso, Darwiniana 18: 338 & 410. 1974.

Recent collectors have found this plant growing at 1000—1200 meters altitude, flowering in March and December. The corollas are said to have been "rose" on Meyer & Vaca 23619, "lilac" on Cabrera, Solbrig, Torres, & Vuillemier 16811, and "white" on Cabrera & Fabris 13247.

Altschul (1973) reports that this species is used to "purify" blood in Argentina, citing Jørgensen 1025. Briquet (1902) cites Wilczek 46. Troncoso (1974) records it from Catamarca, La Rioja, and Salta.

Material has been misidentified and distributed in some herbaria as L. turbinata Griseb. and as Lantana sp.

Additional citations: ARGENTINA: Catamarca: Risso 687 (N); Rodriguez Vaquero 351 (Ut—3305388). Jujuy: Cabrera & Fabris 13247 (N); Cabrera, Solbrig, Torres, & Vuillemier 16811 (S). Salta: Dillon & Rodriguez 540 (Ld). Tucumán: Krapovickas 3240 (E—1305734); Lillo 5321 [Herb. Inst. Lillo 32385] (E—1208840); Meyer & Vaca 23619 (Ld); Villa 661 (Ms—34160).

LIPPIA HARLEYI Moldenke, Phytologia 31: 231. 1975.

Bibliography: Moldenke, Phytologia 31: 231 & 384. 1975.

Citations: BRAZIL: Bahia: Harley, Renvoize, Erskine, Brighton, & Pinheiro in Harley 16788 (Z--type).

LIPPIA HASSLERIANA Chod.

Additional & emended bibliography: Briq. in Chod. & Hassl., Bull. Herb. Boiss., ser. 2, 304 & 1153. 1904; Briq. in Chod. & Hassl., Fl. Hassler. 2: 489. 1904; Moldenke, Phytologia 13: 355. 1966; Moldenke, Fifth Summ. 1: 156 & 186 (1971) and 2: 556, 773, & 891. 1971; Troncoso, Darwiniana 18: 334, 337, & 410. 1974.

Pedersen encountered this plant on rough grasslands. The corollas are said to have been "white" on Pedersen 9520. Troncoso (1974) cites this same collection from the San Isidro herbarium.

Additional citations: PARAGUAY: Pedersen 9520 (N).

LIPPIA HATSCHBACHII Moldenke, Phytologia 27: 65—66. 1973.

Synonymy: Lippia hatschbachii Moldenke, Biol. Abstr. 57: 3780. 1974.

Bibliography: Moldenke, Phytologia 27: 65—66 (1973) and 28:

439. 1974; Moldenke, Biol. Abstr. 57: 3780. 1974; Moldenke, Phytologia 36: 44. 1977.

Citations: BRAZIL: Mato Grosso: Hatschbach 31953 (N—isotype, W—2744570—isotype, Z—type).

LIPPIA HEDERAEFOLIA Mart. & Schau.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 266. 1858; Moldenke, Phytologia 14: 407. 1967; Moldenke, Fifth Summ. 1: 156 (1971) and 2: 556 & 891. 1971; Troncoso, Darwiniana 18: 339 & 410. 1974.

Recent collectors describe this plant as shrubby from a perennial base or as a slender, simple, brittle subshrub 0.5—1.5 m. tall, and have found it growing in rocky cerrado and sparse woods, cerrado and burned-over cerrado, caatinga, and on campo slopes, at 800—1200 meters altitude, flowering from February to April and in July. Anderson reports it from a "steep hillside cerrado with pebbly clay soil", while Irwin and his associates encountered it "in cerrado on gravelly slopes", "in cerrado in area of cerrado and campo", "occasional but mostly sterile", and "common but few in flower at this time [March] in cerrado and campo on middle slopes". The corollas are said to have been "bright-magenta" on Irwin & al. 27267, "rose-pink" on Irwin & al. 28442, "pinkish-purple" on Anderson 8832, "bright-rose" on Hill 1068, "lavender-pink" on Anderson 8778, and "red" on Lützelburg 4050. The vernacular name, "camará", is recorded for it by Lützelburg.

Additional citations: BRAZIL: Bahia: Lützelburg 4050 (Mu). Minas Gerais: W. R. Anderson 8778 (N), 8832 (Ld, N); S. R. Hill 1068 (Hl); Irwin, Fonsêca, Reis dos Santos, & Ramos 27267 (Ac), 28442 (Ld); Irwin, Reis dos Santos, Souza, & Fonsêca 23089 (N), 23904 (N); Martius s.n. [in campis deserti Serro Frio Julio 1818] (Mu—46—cotype, Z—cotype). MOUNTED ILLUSTRATIONS: Mart., Fl. Bras. 9: pl. 41. 1851 (N, Z).

LIPPIA HERBACEA Mart.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 266. 1858; Moldenke, Phytologia 12: 201—202. 1965; Moldenke, Fifth Summ. 1: 156 (1971) and 2: 891. 1971; Troncoso, Darwiniana 18: 338 & 410. 1974.

Recent collectors describe this plant as a few-branched shrub, 1.7 m. tall, and have found it growing in brejo (sedge meadow), flowering in January and July. The corollas are said to have been "lilac" on both Hatschbach collections cited below.

Additional citations: BRAZIL: Goiás: Hatschbach 34750 (Z). Minas Gerais: Hatschbach & Ramamoorthy 38008 (Ld); Martius 1705 [Macbride photos 20328] (Mu—47—cotype, Mu—48—cotype, Mu—49—cotype, Z—cotype).

LIPPIA HIERACIFOLIA Cham.

Additional synonymy: Lippia hieraciifolia Martinez-Crovetto, Bonplandia 2: 53, sphalm. 1965.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 266. 1858; Martinez-Crovetto, Bonplandia 2: 35, 52, & 53. 1965; Moldenke, Phytologia 13: 356. 1966; Moldenke, Résumé Suppl. 16: 23. 1968; Reitz, Sellowia 22: 81. 1970; Moldenke, Fifth Summ. 1: 156, 189, & 198 (1971) and 2: 549, 550, 556, & 891. 1971; Troncoso, Darwiniana 18: 340 & 410. 1974.

Recent collectors refer to this plant as "erect" and have found it growing on high campo near habitations and "en pastizal con Butia paraguayensis", flowering in January, March, and September. The corollas are said to have been "yellow" on all the collections cited below. Troncoso (1974) reports it only from Corrientes and Misiones, Argentina, and "Brasil meridional".

Additional citations: BRAZIL: Rio Grande do Sul: O. Camargo 82 [Herb. Anchieta 58638] (B); Rambo 46715 (B), 53033 (B); Reineck & Czermak 66 [Macbride photos 20320] (Mu--3794). ARGENTINA: Corrientes: Krapovickas & Cristóbal 16071 (Ld). Misiones: Krapovickas, Cristóbal, Maruffak, Pire, & Tressens 15332 (Z); Krapovickas & Cristóbal 28706 (Ld).

LIPPIA HIRSUTA L. f.

Additional synonymy: Lippia hirsuta Espinal, Vision Ecolog. Dept. Valle 41, sphalm. 1965. Lippia tomentosa L. f. ex López-Palacios, Revist. Fac. Farm. Univ. Los Andes 15: 59, in syn. 1975 [not L. tomentosa Sessé & Moc., 1940].

Additional bibliography: J. F. Gmel. in L., Syst. Nat., ed. 13, imp. 1, 2: 956 (1789) and imp. 2, 2: 956. 1796; H.B.K., Nov. Gen. & Sp. Pl., ed. folio, 2: 217 (1817) and ed. quarto, 2: 268. 1818; Pers., Sp. Pl. 3: 352. 1819; Schau., Linnaea 20: 479. 1847; Buek, Gen. Spec. Syn. Candoll. 3: 266. 1858; Barnhart, Bull. Torrey Bot. Club 29: 590. 1902; Pittier, Man. Pl. Usual. Venez. 111 & 435. 1926; J. A. Clark, Card-Ind. Gen. Sp. & Var. Pl., issue 245. 1965; Espinal T., Vision Ecolog. Dept. Valle 41 & 44. 1965; Hocking, Excerpt. Bot. A.9: 367. 1965; Schubert, Assoc. Trop. Biol. Bull. 4: 73. 1975; Hocking, Excerpt. Bot. A.11: 103. 1967; Moldenke, Phytologia 14: 407. 1967; Espinal T., Vision Ecolog. Dept. Valle Cauca 29, 34, 41, & 44. 1968; H. Weber in Fittkau, Illies, Klinge, Schwabe, & Sioli, Biogeogr. & Ecol. S. Am. 2: [Van Oye, Monog. Biol. 19:] 491. 1968; Moldenke, Fifth Summ. 1: 117 & 124 (1971) and 2: 549, 556, 566, & 891. 1971; Moldenke, Phytologia 23: 417 (1972) and 28: 435, 436, 459, & 460. 1974; López-Palacios, Revist. Fac. Farm. Univ. Los Andes 14: 21 (1974) and 15: 57-61, [fig. 12]. 1975; Moldenke, Phytologia 31: 381, 382, 396, 402, & 403. 1975; López-Palacios, Revist. Fac. Farm. Univ. Los Andes 17: 48. 1976; Moldenke, Phytologia 36: 32. 1977.

Recent collectors refer to this species as a tree, 6-7 m. tall, or a shrub, 2 m. tall, and have encountered it at altitudes of 1900-2100 meters, flowering in January and March. The corollas are said to have been "white" on García-Barriga 11011. It is said to be among the common trees in the dry zone of Valle del Cauca, Colombia, and is called "gallinazo" and "salvio blanco".

López-Palacios (1975), after considerable field study, writes "A la conclusión que he llegado es que en Venezuela no hay evidencia de que exista la L. hirsuta, y por tanto se excluyo de la flora." While he feels that "oblong leaves" characterize typical L. hirsuta, rather than larger heads of flowers and fruits, from var. moritzii, I still feel that the larger-sized heads constitute the more reliable character. A few intermediate specimens occur in herbaria which may perhaps represent a natural hybrid.

It should be noted that the H.B.K. emended reference dates cited above were authenticated by Barnhart (1902). The L. tomentosa Sessé & Moc., referred to above, is a synonym of L. graveolens H.B.K.

The Bernardi 3135 previously cited as L. hirsuta, as well as Ruiz-Terán & López-Palacios 7394 & 10170, appear to be better regarded as var. moritzii (Turcz.) López-Palacios, while Garganta 702 and Hodge 6528 are L. schlimii var. glabrescens (Moldenke) Moldenke.

Additional & emended citations: COLOMBIA: Boyacá: Cuatrecasas 1863 (W--1773188). Caldas: Sneider 3089 (Id). Cundinamarca: García-Barriga 11011 (W--1852208); López-Palacios & Jaramillo M. 3669 (N, Z).

LIPPIA HIRSUTA var. **MORITZII** (Turcz.) López-Palacios, *Revist. Fac. Farm. Univ. Los Andes* 14: 21. 1974.

Synonymy: Dipterocalyx scaberrima Schlecht., *Linnaea* 26: 647. 1853 [not Lippia scaberrima Sond., 1850]. Lippia moritzii Turcz., *Bull. Soc. Nat. Mosc.* 36 (2): 204. 1863. Lippia floribunda Briq., *Ann. Conserv. & Jard. Bot. Genève* 4: 237. 1900 [not L. floribunda Hort., 1959, nor H.B.K., 1817, nor Humb. & Bonpl., 1841, nor Humb. & Kunth, 1843, nor Kunth, 1825, nor R. A. Phil., 1891]. Lippia briquetii Moldenke, *Torreya* 34: 9. 1934. Lippia venezuelensis Moldenke ex Pittier, *Supl. Pl. Usual. Venez.* 62 & 119, in syn. 1939. Lippia schlechtendalii Moldenke, *Phytologia* 2: 53. 1941. Lippia briquetii Moldenke, *Fifth Summ.* 2: 551, in syn. 1971. Lippia hirsuta var. moritziana (Turcz.) López-Palacios, *Revist. Fac. Farm. Univ. Los Andes* 15: 61. 1975.

Bibliography: H.B.K., *Nov. Gen. & Sp. Pl.*, ed. quarto, 2: 267. 1818; Sond., *Linnaea* 23: 87. 1850; Schlecht., *Linnaea* 26: 647. 1853; Turcz., *Bull. Soc. Nat. Mosc.* 36 (2): 204. 1863; R. A. Phil., *Anal. Mus. Nac. Chile Bot.* 1: 59. 1891; Jacks. in Hook. f. & Jacks., *Ind. Kew.*, imp. 1, 2: 95. 1894; Briq., *Ann. Conserv. & Jard. Bot. Genève* 4: 237. 1900; K. Schum. in Just, *Bot. Jahresber.* 28 (1): 497. 1902; Thisel.-Dyer, *Ind. Kew. Suppl.* 2: 106. 1904; Pittier, *Man. Pl. Usual. Venez.* 111 & 435. 1926; Moldenke, *Torreya* 34: 9. 1934; A. W. Hill, *Ind. Kew. Suppl.* 9: 161. 1938; Moldenke, *Alph. List Common Names* 2. 1939; Pittier, *Supl. Pl. Usual. Venez.* 55, 62, & 119. 1939; Moldenke, *Phytologia* 2: 53. 1941; Moldenke, *Alph. List Inv. Names* 23. 1942; Moldenke, *Known Geogr. Distrib. Ver-*

benac., [ed. 1], 32, 95, & 96. 1942; Moldenke, *Phytologia* 2: 107. 1945; Jacks. in Hook. f. & Jacks., *Ind. Kew.*, imp. 2, 2: 95. 1946; Moldenke, *Alph. List Cit.* 1: 7 & 22. 1946; Moldenke, *Alph. List Inv. Names Suppl.* 1: 16. 1947; H. N. & A. L. Moldenke, *Pl. Life* 2: 51, 73, & 81. 1948; Moldenke, *Alph. List Cit.* 2: 352, 580, & 634 (1948), 3: 820 & 974 (1949), and 4: 1075, 1079, & 1132. 1949; Moldenke, *Known Geogr. Distrib. Verbenac.*, [ed. 2], 60, 63, & 189—191. 1949; H. N. & A. L. Moldenke, *Anal. Inst. Biol. Mex.* 20: 9. 1949; E. J. Salisb., *Ind. Kew. Suppl.* 11: 138. 1953; Moldenke, *Résumé* 67, 71, 278, 318, 461, & 462. 1959; Moldenke, *Résumé Suppl.* 1: 5, 19, & 25 (1959) and 2: 4 & 9. 1960; Jacks. in Hook. f. & Jacks., *Ind. Kew.*, imp. 3, 2: 95. 1960; Moldenke, *Résumé Suppl.* 12: 3. 1965; Moldenke, *Phytologia* 12: 79, 111, 207, 208, & 291—292 (1965), 12: 481—482 & 484—486 (1966), and 13: 361—362. 1966; Overwinkler, *Pterid. & Sperm. Venez.* 31 & 78. 1970; Moldenke, *Fifth Summ.* 1: 117 & 124 (1971) and 2: 551, 554, 560, 568, & 893. 1971; Moldenke, *Phytologia* 25: 228. 1973; López-Palacios, *Revist. Fac. Farm. Univ. Los Andes* 14: 21 (1974) and 15: 58—63, [fig. 12]. 1975; Moldenke, *Phytologia* 31: 381, 382, 396, 402, & 403. 1975; López-Palacios, *Revist. Fac. Farm. Univ. Los Andes* 17: 48. 1976; Moldenke, *Phytologia* 36: 32. 1977.

Illustrations: López-Palacios, *Revist. Fac. Farm. Univ. Los Andes* 15: 58, [fig. 12]. 1975.

Recent collectors describe this much-misunderstood plant as a shrub, treelet, or small tree, 3—15 m. tall, erect, unarmed, the crown globose, the trunk straight, cylindric, 30 cm. in diameter at breast height, the "coteza escomosa de color claro", the leaves variable, oblong, oval, or oval-lanceolate to subelliptic or elliptic, bicolored, "envés mas claro, haz manchado de blanco" or pale- to medium-green above, paler beneath, scabrid above, velutinous beneath, papery, dull, evergreen, aromatic, the flower-heads medium-sized for the genus, 6 x 4 mm., greenish-white, in ample panicles, the flowers small, aromatic, attracting many insects. They have found it growing on rocky slopes, in meadows and forests, cloud-forests on steep mountain slopes, and rocky soil near streams, at 800—2300 m. altitude, flowering from August to February and in May and June, fruiting in February, March, June, August, September, and November. Vernacular names reported for it are "amogre", "humo", and "mogre". Benítez de Rojas describes the plant as "leñosa, nervadura al en envés resaltantes, 4 pétalos blancos".

The corollas are also said to have been "white" on Breteler 4134, López-Figueiros & Rodríguez 9081, Pittier 9966, Ruiz-Terán & López-Palacios 1898, 7394, & 10170, and Steyermark 91592 and "cream" on Aristeguieta 3350 and Breteler 3135 & 3398.

The L. floribunda credited to H.B.K., to Humb. & Bonpl., to Humb. & Kunth, and to Kunth by various authors, referred to in the synonymy above, is a synonym of L. schlimii var. glabrescens (Moldenke) Moldenke [not of L. americana L. as previously thought], that of R. A. Philippi is Aloysia reichii Moldenke, and that cred-

ited to "Hort." is Lantana achyranthifolia Desf.

My good friend, Santiago López-Palacios, in a letter to me dated February 27, 1975, says concerning the differences between typical L. hirsuta and its var. moritzii: "No he podido encontrar ninguna diferencia notable entre las dos que justifique una separación específica: el porte de la planta, el indumento y sus características florales son las mismas, sin que tenga valor el carácter de la cabezuelas, pues éstas varían en tamaño según la edad de los árboles, las zonas de crecimiento de los mismos y el estado de madurez de la cabezuelas. Le he conservado rango infraespecífico sólo por la forma de las hojas, que en L. hirsuta, en su forma típica, son oblongo y en la variedad ovadas. La ésta la única diferencia, a pesar de todo no muy firme, pues se encuentran ciertas formas intermedias, prácticamente imposibles de diferenciar, como lo digo en Rev. Fac. de Farm. 14: 58. La diferencia quedaría así:

Hojas oblongas.....Lippia hirsuta

Hojas ovadas.....Lippia hirsuta var. moritzii."

While López-Palacios regards the "ovate leaves", rather than the smaller-sized heads even in full anthesis and/or fruit, as characterizing this variety and distinguishing it from the typical form of the species, I feel that the smaller-sized flowering and fruiting heads constitute a more reliable character, at least in herbarium material.

Regarding L. schlechtendalii López-Palacios says: "Le publicación primitiva de Linnaea 26: 647, comienza así: 'Fruticulus 8-10', corolis albis, in locis siccis ad Chacafito, alt. c. 4000'. Novb. (426) — Dipterocalycis genus olim a Chamisso constitutum, a beato Schauero cum Lippia conjunctum, a nostra sententia restituendum", y luego sigue la descripción. El Dr. Moldenke.... 'Nada conozco de esta planta, excepto lo que de ella se da en la descripción original'.

"No incluyo este taxon en la Flora, porque nunca he visto el ejemplar 426 de Wager, en que se funda, posiblemente destruido en B.

"He estado en Chacafito y en todo el Dto. Federal no aparece Lippia alguna que concuerde con la descripción de von Schlechtendal, a no ser la L. moritzii. Tengo el convencimiento de que son coespecífica y de que se trata de una sola y misma cosa.

"Por fortuna el ejemplar de Wager no ha aparecido; y oja lá no aparezca, pues si ello ocurre y se confirman mis presunciones, la L. moritzii Turcz. pasaría definitivamente a sinonimia para dar lugar a la L. schlechtendalii, ya que la descripción de ésta antecede en 10 años a la de Turczaninow."

Turczaninow's original description (1863) is far superior to that of Schlechtendal: "Lippia (Zapania) Moritzii. L. caule fruticoso tetragono, apice cum petiolis atque inflorescentia dense pubescentibus; foliis petiolatis ovato-lanceolatis, acuminatis, basi minus angustatis, fere a basi serratis scabris, supra bulla-

to-rugosis, subtus reticulatis; paniculis axillaribus pedunculatis et terminali sessili magis composita trichotomis, ramis ultimis racemosis; capitulis ovatis; bracteis ovatis acutiusculis tubum corollae superantibus; laciniis calycinis margine nec dorso ciliatis. Capitula parva, magnitudine illorum L. pauciserratae. Venezuela, prope coloniam Tovar, Moritz No 1640, sub L. callicarpaefolia dubitanter determinata."

Material of this variety has been misidentified and distributed in some herbaria as L. callicarpaefolia H.B.K., L. hirsuta L. f., and Labiatae. On the other hand, the Cuatrecasas 1863 and Fosberg 22193, previously cited as this variety, actually represent typical L. hirsuta. The Bernardi 3135, cited below, was previously (1966) erroneously cited as typical L. hirsuta.

Additional & emended citations: COLOMBIA: Caldas: Sneidern 3016 (S), 3089 (S). Cundinamarca: Kpíe 4524 (Cp, Ld); Triana 2049 (Br). Magdalena: Seifritz 397 (W—1572471). Norte de Santander: López-Palacios 3578 (N, Z). VENEZUELA: Aragua: Allart 288 in part (Ve—12773), 288a (W—1231237); Fendler 863 (Br, E—1948650, F—photo, N, N—photo, Si—photo, Z—photo); Lasser & Foldats 4276 (Ve); Moritz 1640 (Z—photo of type); Pittier 9966 (N, W—1186992); Ruiz-Terán & López-Palacios 10170 (Ac); J. A. Steyermark 91592 (Ve, W—2583946); Vogl s.n. [Maracay] (Mu). Distrito Federal: Allart 85 (N, Ve—12777, W—1199018), 167 (N, Ve, W—1231158); Badillo 694 (Ve—12770); Bailey & Bailey 994 (Ba, W—1198400); Davidse & Morillo 4015 (Ld, N); Delgado 54 (Ve—12771, W—1692661), 507 (Ve); Eggers 13580 (Lu, S, W—939323, W—1234732); Lasser 1008 (W—1878281), s.n. [Steyermark 55099] (F—1205145); Pittier 9869 (W—1186477), 9870 (N, W—1186478), 9966 (N), 12251 (Kr), 13779 (Ve—12772, W—1740474); Ll. Williams 10625 (Ve—12769), 12251 (Ca—734500, W—1778908); Williams & Alston 18 [Ll. Williams 10625] (Ve—12768). Lara: Benítez de Rojas 1741 (Ut—3286348). Mérida: Bernardi 3135 (N), 3735 (Ve), 6399 (N), s.n. [10 Mayo 1956] (N); Breteler 3398 (S); Gines 1587 (W—2048533); López Figueiras & Rodríguez 9081 (W—3739882); López-Palacios 3160 (Ld, N); López-Palacios & Bautista 3380 (Ac, Ld); Oberwinkler & Oberwinkler 12449 (Mu); Ruiz-Terán & López Figueiras 1898 (N), 1922 (N). Miranda: Allart 288 in part (N). Táchira: Henri 1 (W—2383065). Trujillo: Aristeguieta 3350 (N); Breteler 4134 (N); Jahn 1140 (Ve, W—1186740); Ruiz-Terán & López Figueiras 2213 (N); Ruiz-Terán & López-Palacios 7394 (Ld).

LIPPIA HIRTA (Cham.) Meisn.

Additional & emended synonymy: Lippia hirta "(Cham.) Meisn. ex C. Dietr." apud Hocking, Excerpt. Bot. A.11: 103. 1966. Lippia hirta Spreng. ex Moldenke, Résumé Suppl. 18: 13, in syn. 1969.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 266.

1858; Angely, Fl. Anal. Paran., ed. 1, 575. 1965; Hocking, Excerpt. Bot. A.11: 103. 1967; Moldenke, Phytologia 14: 407. 1967; Moldenke, Fifth Summ. 1: 156 & 476 (1971) and 2: 555, 557, & 892. 1971; Troncoso, Darwiniana 18: 334, 337, & 410. 1974.

Recent collectors describe this plant as erect, 0.7--1 m. tall, with a xylopodium, and have encountered it on campos, dry or grassy campos, and "campo limpo", flowering from December to March, fruiting in December and January. The corollas are said to have been "purple" on Hatschbach 23312 & 31739, "lilac" on Hatschbach 13511 & 23246, "deep-lilac" on Hatschbach & Koozicki 18442, "red" or "rose" on Pereira 8324, "violet" on Hatschbach 8679 & 28563, and "wine-color" on Hatschbach 36797 & 37915.

Troncoso (1974) cites Smith & Klein 10672 from Santa Catarina, Brazil, in the San Isidro herbarium.

Additional citations: BRAZIL: Paraná: Dusén 16263 (Mu), s.n. [12.3.1904] (Mu—4240); Hatschbach 8679 (Mu), 13511 (W—2563853), 23246 (Mi), 25971 (Ld), 28563 (Ld), 31739 (N), 37915 (Ld); Hatschbach & Koozicki 18442 (Ft, N, W—2536559); Hatschbach & Pedersen 36797 (Ld); Hatschbach, Smith, & Klein 12139 (Ac); Krapovickas, Cristóbal, & Maruffak 23089 (Ld), 23312 (Ld); E. Pereira 8324 [Pabst "7599" & 7699; Herb. Brad. 30657] (Mu, N); Reitz & Klein 17411 (N, W—2548340).

LIPPIA HISPIDA Good.

Additional bibliography: Fedde & Schust. in Just, Bot. Jahresber. 58 (2): 329. 1938; Moldenke, Phytologia 12: 212. 1965; Moldenke, Fifth Summ. 1: 244 (1971) and 2: 892. 1971; Moldenke, Phytologia 28: 442. 1974.

Pritchard describes this plant as a small shrub, 4--6 feet tall, with lemon-yellow flowers, and found it growing on riverbanks, at 1875 meters altitude, flowering in July.

The type specimen of this species is deposited in the herbarium of the British Museum (Natural History) in London.

Additional citations: ANGOLA: Huila: Pritchard 306 (E—1674076, Z). Province undetermined: Gosseweiler 2362 [Mo. Bot. Gard. photo A.833] (Gz—photo of type, N—photo of type).

LIPPIA HOEHNEI Moldenke

Additional & emended bibliography: F. C. Hoehne, Resen. Hist. Secc. Bot. Agron. Inst. S. Paulo 153 & 161. 1937; Moldenke, Phytologia 1: 467--468 (1940) and 12: 212--213. 1965; Moldenke, Fifth Summ. 1: 156 (1971) and 2: 892. 1971; Moldenke, Phytologia 31: 384. 1975; Hocking, Excerpt. Bot. A.28: 257. 1976.

This binomial was first published effectively by Hoehne (1937) as a hyponym -- the type is cited, but without description -- in April, 1937, validated later by me in 1940. Recent collectors describe the plant as an erect subshrub or shrub, 1--1.7 m. tall, "não ramosa", the bracts lilac in color, and have found it growing along roadsides, in cerrado, and on "campo limpo", at alti-

tudes of 550—770 meters, flowering in February, June, August, and September, in fruit in February and August. Irwin and his associates report it "frequent" in cerrado, while Maguire and his associates refer to it as "frequent" after fires. The corollas are said to have been "rose" color on Hatschbach 34066 & 34691, "rosy-white" on Maguire & al. 56837, "red-violet" on Irwin & al. 16489, and "lavender-pink" on Maguire & al. 56319.

Additional citations: BRAZIL: Mato Grosso: Goodland 511 (N); Hatschbach 34066 (Z), 34601 (Ld); Irwin, Grear, Souza, & Reis dos Santos 16489 (Ld, W—2795964); Maguire, Murça Pires, Maguire, & Silva 56319 (N), 56837 (N, N).

LIPPIA HOEHNEI var. GOYAZENSIS Moldenke, Phytologia 30: 349. 1975.

Bibliography: Moldenke, Phytologia 30: 349 (1975) and 31: 384. 1975; Hocking, Excerpt. Bot. A.28: 257. 1976.

Citations: BRAZIL: Goiás: Hatschbach 34642 (Z—type).

LIPPIA INDICA Moldenke

Additional bibliography: Sebastine, Bull. Bot. Surv. India 4: 223. 1962; Moldenke, Phytologia 12: 216—217. 1965; Blasco, Inst. Franç. Pond. Trav. Sec. Scient. Tech. 10: 384. 1971; Moldenke, Fifth Summ. 1: 277 (1971) and 2: 892. 1971; Moldenke, Phytologia 34: 275 (1976) and 38: 392. 1978.

Material of this species has been misidentified and distributed in some herbaria as Lantana albiflora Wight.

Additional citations: INDIA: Coimbatore: Wight 2295bis (Mu—1341, Z).

LIPPIA INOPINATA Moldenke

Additional bibliography: Moldenke, Phytologia 14: 408. 1967; G. Taylor, Ind. Kew. Suppl. 14: 79. 1970; Moldenke, Fifth Summ. 1: 72 (1971) and 2: 892. 1971.

Recent collectors describe this plant as a slender shrub, 3 meters tall, "with a dense bloom of yellowish-white flowers", and have found it growing in dry lowland forest, in "xeric matorral of Opuntia, Bursera, and Ipomoea arborescens [intrapilosa]", and on "ladera riolítica con vegetación de matorral de Opuntia y Prosopis", at altitudes of 130—2045 m., flowering in February, October, and November. The corollas are said to have been "yellow" on Rzedowski 25093.

Additional citations: MEXICO: Aguascalientes: Detling 8739 (Ip, W—2669357); J. Rzedowski 25093 (M1, Z). Jalisco: Gentry & Gentry 23542 (W—2820869). Puebla: R. McVaugh 22493 (Ip).

LIPPIA INSIGNIS Moldenke, Phytologia 32: 483 & 485. 1976.

Bibliography: Moldenke, Phytologia 32: 483 & 485 (1976) and 34: 258. 1976; Hocking, Excerpt. Bot. A.28: 259. 1976.

Citations: BRAZIL: Bahia: Harley, Renvoize, Erskine, Brighton, & Pinheiro in Harley 17009 (K—type, Z—photo of type).

LIPPIA INTEGRIFOLIA (Griseb.) Hieron.

Additional & emended bibliography: Hieron., Bol. Acad. Nac. Cienc. Córdoba 4: [Sert. Sanjuan.] 406. 1881; Fester & Martinuzzi, Rev. Fac. Quim. Ind. & Agr. Univ. Nac. Litoral. Santa Fé Arg. 19: 54--74. 1950; Anon., Chem. Abstr. 45: 7306--7307 (1951) and 46: 11586--11587. 1952; Fester & Martinuzzi, Anal. Asoc. Quim. Arg. 40: 36--60. 1952; Canosa, Rev. Asoc. Bioquim. Arg. 18: 225--230. 1953; Anon., Chem. Abstr. 48: 3638. 1954; Karrer, Konstit. & Vork. Organ. Pflanzenst. 32. 1958; Moldenke, Phytologia 14: 408. 1967; Farnsworth, Blomster, Quimby, & Schermerh., Lynn Index 6: 265. 1969; Moldenke, Fifth Summ. 1: 198 (1971) and 2: 557, 567, & 892. 1971; Hegnauer, Chemotax. Pfl. 6 [Chem. Reihe 21]: 668. 1973; Moldenke, Phytologia 28: 441. 1974; Troncoso, Darwiniana 18: 338 & 410. 1974.

Recent collectors refer to this plant as herbaceous or as a shrub, 1 m. tall, and have found it growing at 2800 meters altitude, flowering from February to April, fruiting in February and April. The corollas are said to have been "white" on Garcia 906 and on Krapovickas & al. 21924. Troncoso reports it from La Rioja, Salta, San Juan, San Luis, and Tucumán, Argentina.

Karrer (1958) reports the presence of dipentene, $C_{10}H_{16}$, in this plant and in such unrelated species as Baeckea cremulata, Libocedrus bidwellii, Litsea zeylanica, Phyllocladus trichomanoides, Picea mariana, Pittosporum tenuifolia, etc. Fester & Martinuzzi (1951, 1952) report the presence of a volatile oil, 1-limonene, dipentene, 1-camphor, a sesquiterpene, and a compound (ester or lactone) in volatile oil in the leaves, where Canosa (1953) found eucalyptol, dipentene, and camphor in volatile oil.

Material of L. integrifolia has been misidentified and distributed in some herbaria as L. turbinata Griseb.

Additional citations: ARGENTINA: Catamarca: Reales 1030 (N), 1281 (N), 1315 (N). La Rioja: Cabrera, Solbrig, Torres, & Vuillemier 16700 (Au--262484). Mendoza: Ruiz Leal 15452 (Tu--162098). Salta: Krapovickas, Maruffak, Oliva, & Pueyo 21924 (Ld). Santiago del Estero: P. Garcia 906 (N).

LIPPIA INTERMEDIA Cham.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 266. 1858; Angely, Fl. Anal. Paran., ed. 1, 576. 1965; Moldenke, Phytologia 13: 357. 1966; Moldenke, Fifth Summ. 1: 156 (1971) and 2: 539, 553, 618, & 892. 1971; Moldenke, Phytologia 25: 229 & 230 (1973) and 28: 403 & 439. 1974; Troncoso, Darwiniana 18: 340 & 410. 1974.

Troncoso (1974) reports this species from Brazil and Paraguay. Krapovickas and his associates found it growing "in pajonal", with yellow flowers in March.

Additional citations: ARGENTINA: Misiones: Krapovickas, Cristóbal, & Maruffak 15721 (Ws).

LIPPIA INTERMEDIA var. PARVIFOLIA Moldenke, Phytologia 28: 403. 1974.

Bibliography: Moldenke, Phytologia 28: 403 & 439. 1974.

Citations: BRAZIL: Paraná: Hatschbach 32582 (Z-type).

LIPPIA IODOPHYLLA Schau.

Additional bibliography: Buek, Gen. Spec. Syn. Candoll. 3: 266. 1858; Moldenke, Phytologia 13: 357--358. 1966; Angely, Fl. Anal. & Fitogeogr. Est. S. Paulo, ed. 1, 4: 835 & xi, map 1385. 1971; Moldenke, Fifth Summ. 1: 157 (1971) and 2: 892. 1971.

The Angely (1971) reference, cited above, is often listed as published in "1970", the erroneous title-page date.

Lindeman & Bárcia refer to this plant as a shrublet, 60 cm. tall, with rose-colored corollas "(10P8/4)", and found it growing in low woods, at an altitude of 1950 meters, flowering in July. Lützelburg encountered it on moist granite, at 2300 meters altitude, with light-rose corollas, flowering in January.

Additional citations: BRAZIL: Rio de Janeiro: Carauta, Strang, & Bárcia s.n. [Carauta 1161; Strang 1438; Herb. Cent. Pesq. Flor-est. 7705] (Fs); Lützelburg 6617 (Mu), 12232 (Mu). Rio Grande do Sul: Lindeman & Bárcia 6444 (Ut--320429).

LIPPIA JALISCANA Moldenke

Additional bibliography: Moldenke, Phytologia 13: 358. 1966; Moldenke, Fifth Summ. 1: 72 (1971) and 2: 892. 1971.

LIPPIA JANGADENSIS S. Moore

Additional bibliography: Moldenke, Phytologia 13: 358. 1966; Moldenke, Fifth Summ. 1: 156 (1971) and 2: 892. 1971.

LIPPIA JANGADENSIS var. EITENORUM Moldenke

Additional bibliography: Moldenke, Phytologia 13: 358. 1966; Moldenke, Fifth Summ. 1: 156 (1971) and 2: 892. 1971.

LIPPIA JAVANICA (Burm. f.) Spreng.

Additional & emended synonymy: Lantana lavandulacea Willd. in L., Sp. Pl., ed. 4, 3: 319. 1800. Verbena odorata Desf. ex Steud., Nom. Bot. Phan., ed. 1, 873 & 898, in syn. 1821 [not V. odorata L'Hér., 1941, nor Meyen, 1834, nor Meyer, 1946, nor Pers., 1821]. Lippia asperifolia J. H. W. Pearson ex C. A. Sm., Common Names S. Afr. Pl. 601, in syn. 1966. Lippia asperifolia asperifolia "A. Rich. ex Marthe" apud Raju, Bull. Bot. Soc. Beng. 23: 70. 1969. Lantana asperifolia A. Rich. ex Moldenke, Fifth Summ. 2: 535, in syn. 1971. Lantana lavandulacea Willd. ex Moldenke, Fifth Summ. 2: 540, in syn. 1971. Lippia javanica (Burch.) Spreng. ex Moldenke, Fifth Summ. 2: 557, in syn. 1971. Lippia lavandulaefolia Schwaegr. ex Moldenke, Phytologia 36: 44, in syn. 1977. Verbena odorata J[uss.] ex Moldenke, Phytologia 36: 47, in syn. 1977.

Additional & emended bibliography: Willd. in L., Sp. Pl., ed. 4,

3: 319. 1800; Desf., *Tabl. Écol. Bot.*, ed. 1, 54. 1804; Willd., *Enum. Pl. Hort. Berol.* 2: 652. 1809; Desf., *Tabl. Écol. Bot.*, ed. 2, 65. 1815; Pers., *Sp. Pl.* 3: 354. 1819; Sweet, *Hort. Brit.*, ed. 1, 1: 324 (1826) and ed. 2, 418. 1830; Harv., *Gen. S. Afr. Pl.*, ed. 1, 268. 1838; Sweet, *Hort. Brit.*, ed. 3, 552. 1839; Otto & Dietr., *Allg. Gartenzeit.* 10: 315. 1842; Schau. in A. DC., *Prodr.* 11: 556, 583, 593, & 608. 1847; Buek, *Gen. Spec. Syn. Candoll.* 3: 253, 265, 266, 494, 495, & 507. 1858; Harv., *Gen. S. Afr. Pl.*, ed. 2, 291. 1868; T. R. Sims, *Sketch & Check-list Fl. Kaffr.* 63. 1894; Durand & DeWild., *Bull. Soc. Roy. Bot. Belg.* 37: 124. 1898; Baker & Stapf in Thiselt.-Dyer, *Fl. Trop. Afr.* 5: 278 & 280. 1900; E. D. Merr., *Philip. Journ. Sci.* 19: 376. 1921; Watt & Breyer-Brandwijk, *Med. & Poison. Pl. S. Afr.*, ed. 1, 154 & 235. 1932; Savage, *Cat. Linn. Herb. Lond.* 4. 1945; J. Hutchins., *Botanist South. Afr.* 294, 305, & 672. 1946; Glover, *Prov. Check List Brit. & Ital. Somal.* 268. 1947; Anon., *Chem. Abstr.* 42: 4307. 1948; Naves, *Helv. Chim. Act.* 31: 29—32. 1948; R. O. Williams, *Useful & Ornament. Pl. Zanzib.* [20], 48, 95, 332, & 360, fig. 5. 1949; Anon., *Garcia de Orta* 847—854. 1960; Costa, *Cardoso do Vale, & Maia e Vale, Garcia de Orta* 8: 299—313. 1960; Glover, Stewart, Fumerton, Marindany, & Andersen, *Gloss. Botan.-Kipsig. Names* 160 & 256. 1960; Martin & Noel, *Fl. Albany & Bathurst* 92. 1960; Dale & Greenway, *Kenya Trees & Shrubs* 588. 1961; Anon., *Hortic. Abstr.* 32: 444. 1962; Costa, *Cardoso do Vale, & Maia e Vale, Hortic. Abstr.* 32: 447. 1962; Watt & Breyer-Brandwijk, *Med. & Poison. Pl. S. Afr.*, ed. 2, 1051 & 1410. 1962; Compton, *Journ. S. Afr. Bot. Suppl.* 6: 65, 156, 176, & 179. 1966; C. A. Sm., *Common Names S. Afr. Pl.* 213, 306, 322, & 601. 1966; Amico, *Webbia* 22: 490, 498, 520, & 523. 1967; Hocking, *Excerpt. Bot. A.* 11: 103. 1967; Moldenke, *Phytologia* 14: 408—409 & 419 (1967) and 16: 184. 1968; Amico & Bavazzano, *Webbia* 23: 280 & 300. 1968; Moldenke, *Résumé Suppl.* 16: 8 & 23. 1968; Farnsworth, Blomster, Quimby, & Schermerh., *Lynn Index* 6: 264 & 267. 1969; Glover, Stewart, Fumerton, Marindany, & Andersen, *Gloss. Botan.-Kipsig. Names* 159, 160, 216, & 256. 1969; Raju, *Bull. Bot. Soc. Beng.* 23: [69]—70, fig. 1. 1969; Richards & Morony, *Check List Fl. Mbala* 238. 1969; Vander Schiff, *Check List Vasc. Pl. Kruger Natl. Park* 81. 1969; Gillett, *Numb. Check-list Trees Kenya* 46. 1970; Tweedie & Agnew, *Journ. East Afr. Nat. Hist. Soc. & Nat. Mus.* 28: 55. 1970; Greenway & Vasey-Fitzgerald, *Journ. East Afr. Nat. Hist. Soc. & Nat. Mus.* 28: 21. 1971; Ivens, *East Afr. Agric. For. Journ.* 37: 173. 1971; Moldenke, *Fifth Summ.* 1: 213, 230, 234, 237, 239, 241, 246, 248, 250, 252, 254, 255, 257, 366, & 397 (1971) and 2: 535, 539, 540, 543, 551, 552, 557, 565, 601, 652, 660, 678, 685, 686, 708, 736, 738, & 892. 1971; Anon., *Biol. Abstr.* 53 (5): B. A.S.I.C. S.146 & S.192. 1972; Danganan, *Biol. Abstr.* 54: 3953. 1972; N. F. Good, *Biol. Abstr.* 53: 2377. 1972; Moldenke, *Phytologia* 23: 432. 1972; Schaller, *Serenget. Lion* 119. 1972; Venter, *Journ. S. Afr. Bot.* 38: 231. 1972; Farnsworth, *Pharmacog. Titles* 8 (11): vii & 896. 1973; Hegnauer, *Chemotax. Pfl.* 6 [Chem. Reihe 21]: 663, 668, & 674. 1973; Jacobsen, *Kirkia* 9: 172. 1973; Neid-

lein & Stähle, Deut. Apoth.-Zeit. 113: 1219--1222 (1973) and 114: 1588--1592 & 1941. 1974; Farnsworth, Pharmacog. Titles 9 (6): vi & 504. 1974; Moldenke, Phytologia 28: 450. 1974; Asher, Guide Bot. Period. 2 (8): 23. 1975; Moldenke, Phytologia 30: 134 (1975), 34: 280 (1976), 36: 37, 44, & 47 (1977), 38: 257, 266, 386, 392--394, 401, & 405 (1978), and 39: 29. 1978.

Additional illustrations: R. O. Williams, Useful & Ornament. Pl. Zanzib. [20], fig. 5 [as "Lantana salvifolia"]. 1949; Raju, Bull. Bot. Soc. Beng. 23: 70, fig. 1. 1969.

Recent collectors describe this plant as a small, erect, woody herb, soft bush, or a rather small, spreading, open, semi-woody, thin, pubescent, aromatic shrub with a Salvia-like scent, 0.5--3.2 m. tall, but seldom exceeding 6 feet in height without support; stems very light-brownish, with gray hues, papery-scaly, dark-purple toward the top; twigs light-brown, puberulous; leaves papery-membranous, more or less gray-green or else glossy bright-green with sunken veins above and dull light-green beneath with pale, prominent, hairy veins, rough, with a pleasant spicy odor [or "fetid"] when crushed; flowers small, in round heads in the leaf-axils, strongly and characteristically aromatic, with a somewhat sour (acid) smell reminiscent of Mangifera indica, regarded as pleasant by some, unpleasant by others; calyx light-green; anthers yellow. The fruit is described as "purple" by Rodin and by Wasserfall, but this seems most unlikely.

Schweickerdt notes for his no. 1222: "bracts shorter than the flowers, 3 mm. long, 2--2.5 mm. wide, elliptic-ovate, very shortly acuminate; calyx distinctly 2-lobed or subtruncate with 4 very small teeth, 1.5 mm. long; corolla-tube 2.75 mm. long, 1--1.25 mm. diam., middle tooth of lower lip 1.25 mm. broad; stamens in 2 rows, sometimes all or 2 or 3 abortive; anthers 0.5 mm. long; ovary glabrous; style 1 mm. long". Dehn 53 includes a hand-colored painting of the plant in situ and of floral dissections on the sheet.

Dale & Greenway (1961) describe L. javanica as a "Much-branched small shrub sometimes growing to 14 ft. Stems clothed in short stiff hairs. Leaves opposite or ternate, oblong often lanceolate to narrowly elliptic to 2 in. long, margins serrulate or crenate-serrulate, upper surface rough, lower pubescent. Flowers small, white in globose or oblong subsessile heads to 1/2 in. long; corolla as long as subtending bract. Fruits small, pale brown. Widely spread [in Kenya]."

The corollas are described as having been "white" by Venter (1972) and on Bayliss BS.6251, Marques 2447, Martin 916, Mwangi & Abdalla 261, Rau & Schlieben 9637, Rodin 3871, Wasserfall 909, Wells 1121, and Werdermann & Oberdieck 2111, "white with yellowish throat" on Bos 1243, "yellowish-white" on Strid 3470, "yellowish-white, yellow in throat" on Maas-Geesteramus 5210 & 6364, "pale greenish-creamy-white" on Scheepers 126, and "violet" by Martin & Noel (1960).

Recent collectors have found this plant growing in dry or san-

dy soil, open or coastal grasslands, secondary scrub, and grassveld scrub, along roadsides, on sandy flats, the sides of ant-hills, and hillsides protected from grazing, at altitudes of 4—2330 meters, flowering in January, February, April to July, September, and October, fruiting in January, February, April, June, September, and October.

Rodin encountered it in a "mountainous area with many springs and streams, some wooded and some grassy areas, basically dolomites and limestone covered with deep humus in many places". Maas-Geesteranus found it "scarce among tall grasses at edge of forest on grassy slopes near stream with scattered shrubs" and "rather common in savanna woodland along edge of forest with scattered Acacia lahai and extensive clumps of dense brushwood". Jacobsen (1973) refers to it as "occasional" in grassland and scrub in Rhodesia; Greenway & Vesey-Fitzgerald (1971) report it as "ruderal, invading secondary vegetation" in the Lake Manyara National Park; Compton found it on the high veld of Swaziland; while Van der Schijft (1909) calls it an "aromatic herb scattered throughout the [Kruger National] Park, common on overgrazed veld". Martius s.n. [Salgado] is labeled "Minas Gerais, Brazil" in the Munich herbarium, but surely in error. The species is not known from America. Schlieben refers to it as "abundant". Mwangani & Abdalla found it in open bushland on Eucalyptus plantations, while Marques encountered it in shrubby savannas with Maytenus heterophyllus, Sclerocarya caffra, Combretum sp., Veronica colorata, etc., and Wells found it in regenerating bush clumps on grassy slopes. Frazier reports it "frequent" on the island of Zanzibar.

Williams (1949) records the species from both Zanzibar and Pemba islands. In his work he asserts that his illustration of it is on page 19, but it is actually on p. [20]. Venter (1972) records the species from Zululand, and Amico (1967) from Zambezia, Mozambique. Raju (1969) reports it "for the 1st time from India", but his plants probably are the rather similar Asiatic L. indica Moldenke or L. unica Ramakrishn. Sweet (1839) reports it introduced into cultivation in England in 1822.

Vernacular and common names recorded for L. javanica by recent collectors and authors include "beukebos", "bokhukhwana", "chemosoriot", "fever-tree", "in-daind-ziniba", "inzinziniba", "karnet", "koorsbossie", "koorsteebossie", "lantana à feuill. de sauge", "lemoenbossie", "maagbossie", "mokinik", "mosukubyanana", "mosukutswana", "mosungsani", "mpambake", "muhuki", "mukurdu", "mumara", "mussutane", "musuzwane", "mutshwane", "mutswane", "mwende", "mwokyot", "muzireti", "ol magirigirieni", "ol-sinoni", "sulasula", "umshani-umkulu", "umsuzwana", "umsuzwane", "umzinzinibe", and "wild tea". Glover and his associates (1960) explain the derivation of some of these common names: "mwok", to shoot -- referring to plants which come up straight and quickly; but the name could apply to the straight woody stems which are used for building the walls of huts before the mud plaster is put on them".

Williams (1949) reports the leaves being used medicinally in Zanzibar; Sims (1894) also lists the species as medicinal. Smith (1966) says that it is used by the Hottentots in the treatment of "any fever". Naves (1948) found it to contain ocimene, ocimenone, and myrcenone in volatile oil. Amico & Bavazzano (1968) report: "Droghe -- Foglie: bollite sono adoperate contro i raffreddori; l'infuso è considerato febbrifugo, antimalarico, antidissenterico: è usato anche nelle malattie dell'apparato respiratorio".

Costa and his associates (1960) report its use by the natives of Angola as a vesicatory and in treating fevers. These authors give detailed chemical studies of the plant, identifying dipentene and tagetenones. No alkaloids or saponinoids were found. Both pyrogallol and pyrocatechol types of tannins were found.

Watt & Breyer-Brandwijk (1962) give the following résumé of its uses in southern and eastern Africa: "The Xhosa drink a weak infusion of the leaf and stem.....made with either milk or water, for coughs, colds and bronchial troubles in general. The leaf is variously described as having the odor of vanilla or of mint and has been used as a tea substitute.....The infusion is sometimes made with the addition of Artemisia afra and is then used also for fevers, influenza, measles and as a prophylactic against lung inflammations.....The plant is also used by the Xhosa for disinfecting anthrax-infected meat. The Kwena and the Tswana use a decoction of the leaf as a cough and cold remedy. Hewat..... states that the African uses the plant in the treatment of anthrax but that it is poisonous and the treatment is risky. There is no confirmatory evidence of the plant's toxicity but Burchell records that it is much eaten by goats.....The smoke from burning the plant is sometimes inhaled for respiratory conditions....The Zulu drink an infusion of the leaf for 'gangrenous rectitis' and use the plant in treating measles, urticaria, and other rashes... In Rhodesia the plant is a native remedy for blackwater fever, malaria, dysenteries and other diseases.....The Masai make a red ointment which is used to decorate the body....The plant yields a volatile oil.....Flowering tops from Tanganyika have yielded 0.4 per cent of a volatile oil rich in ocimene....Barbier...has found that the oil yields 65 to 70 per cent of a liquid $C_{10}H_{16}O$ bp 106-8° which has an agreeable odour of lemon. The Lobedu stuff the nose with the crumpled leaf to stop nasal haemorrhage and colds. The leaf, boiled in water, is a Shangana cough remedy and a Swati remedy for influenza and colds. The plant is used as a malaria remedy among the Nnquoi Bushmen of South West Africa. It appears to be avoided by grazing animals.....but is reported to be eaten by them to some extent.....It contains icterogenin and has been under grave suspicion as a cause of geeldikkop..... Its ingestion by stock results in photosensitization....."

Ivens (1971) reports that when L. javanica becomes a troublesome "weed" good control may be obtained with 2,4-D ester herbicide since the "species proved relatively susceptible both to 2,4-D ester at 2.2 kg./ha. and to picloram & 2,4-D mixture at 1.1 kg./ha., the kills in May, 1970 being estimated as 80--90 per

cent with both treatments. The fire in December, 1970 influenced the results on Lippia also, but in adjacent, unsprayed areas, plants resprouted rapidly from the base of the stem after the burn."

In reviewing the much-discussed synonymy of this taxon it may be worthwhile to quote here the original description of Lippia scabra Hochst. (1845): "n. sp. 247. Lippia scabra Hochst. Foliis subsessilibus oblongis crenatis, versus basin attenuatis integerrimis, supra scabris, subtus resinoso-punctatis subtomentosis, capitulis axillaribus cylindricis hirtellis, pedunculo scabro folium subaequante, drupa calyce bivalvi tecta, bipartibili. Planta aromatica (fruticosa?), Lantanæ salviaefoliae Jacq. similis, ad sylvarum margines circa Natal-bai, Junio 1839 lecta."

The Verbena odorata Desf., listed in the synonymy of Lippia javanica (above), was mistakenly regarded by Steudel (1821) as a synonym of Zapania odorata Pers. which is listed by me in the synonymy of L. alba var. globiflora (L'Hér.) Moldenke. The original description of Zapania odorata Pers. (1806) is: "odorata, spic. oblongo-globosis, fol. lanceolatis crenatis rugosis scabris, caul. fruticoso: Verb. odorata H.P. V. globifera Willd. l.c. L'Herit. Strip. l. p. 23, t. 12. Z. lantanoides Lam. Hab. in Amer. meridionali. Spic. demum teretes." In my opinion, Z. odorata Pers., Verbena odorata H[ort.] P[aris.], and Zapania lantanoides Lam. are all synonyms of Lippia alba (Mill.) N. E. Br., Verbena globifera Willd. is L. alba var. globiflora, and Verbena odorata Desf. is L. javanica.

The name, Lantana lavandulacea Willd. [in L., Sp. Pl., ed. 4, 3: 319. 1800], is often quoted by authors as a synonym of Lippia alba or of Phyla scaberrima (A. L. Juss.) Moldenke, but a close examination of the original description and of a photograph of type material indicates to me that the plant so named by Willdenow is plainly Lippia javanica. Willdenow's original (1800) description is: "*11. LANTANA lavandulacea. W. L. foliis oppositis lanceolatis obtusis superne scabris, capitulis cylindræis, bracteis imbricatis subrotundis acutis. W. Lavendelartige Lantane. W. Habitat..... f (v.v.) In hortis nostris sub nomine L. odoratae obvia, sed abunde distincta. Caulis teretiusculus scaber. Folia opposita, nunquam terna, petiolata, lanceolata obtusa, basi attenuata integerrima, obtuse dentata superne scabra, subtus hirta. Pedunculi foliis breviores. Capitula cylindræa. Bractee villosae subrotundae acutae enerviae imbricatae. Flores admodum parvi albi. W." The type actually is a specimen from a plant cultivated by Bouché at the Berlin botanical garden [Herb. Willdenow 11512]. According to Otto & Dietrich (1842) it "Ist jetzt nicht mehr im Garten. Die Blumen sind zwar weiss, aber die Pflanze scheint gar nicht zu Lantana, sondern zu Lippia oder Zapania zu gehören".

Meeuse (1942) maintains that Verbena javanica Burm. f. and

Lantana alba Mill. are conspecific and therefore the name, Lippia javanica, has priority for the American plant which we now call Lippia alba. Raju (1969) follows him in this and adopts "Lippia asperifolia asperifolia" as the name for the African plant which I regard as the true L. javanica. The two taxa are really quite distinct. Lippia javanica is not native to South America as claimed by Harvey (1868) and Raju (1969), but to eastern and southern Africa, cultivated elsewhere (e.g., France, Germany, and Java). The South American plant is L. alba (Mill.) N. E. Br. and L. alba var. globiflora (L'Hér.) Moldenke. The Indian plant of the Nilgiris, also sometimes regarded as L. javanica, is L. indica Moldenke or L. unica Ramakrishn.

Savage (1945) reports specimen 10a under genus 35, LANTANA, in the Linnean Herbarium, London, is inscribed "Verbena ind. or." in J. E. Smith's handwriting and "javanica Burm. Ind." in Linnaeus' own handwriting.

Jacobsen (1973) cites his nos. 1676 & 3376 from Rhodesia; Van der Schijff (1969) cites his nos. 54, 737, 1056, 1314, 2580, 3426, & 5014; Amico & Bavazzano (1968) cite their nos. 54, 55, & 437; Hutchinson (1946) cites his nos. 1875 & 2013. Dale & Greenway (1961) cite Bally 9815, Napier 407, Van Someren 9231, and Verd-court 973 from Kenya.

Material of L. javanica has been misidentified and distributed in some herbaria as L. adoensis Hochst., L. rehmanni H. H. W. Pearson, and Lantana salvifolia Jacq. On the other hand, the Bayliss BS.4161 and Kuntze s.n. [Kranskloof, 12/3/94], distributed and in the first case previously cited by me as L. javanica, actually prove to be L. pearsoni Moldenke, while Meebold 12830 is L. rehmanni H. H. W. Pearson, Holst 8893 is L. schliebeni Moldenke, and E. A. Robinson 6170 is L. whytei Moldenke.

The Missouri Botanical Garden photograph A.865, cited below, is of a specimen in the British Museum from the Cape of Good Hope, collector undesignated, which the photographer regarded as the type of Verbena globiflora L'Hér. [= Lippia alba var. globiflora (L'Hér.) Moldenke], but this cannot be so. L'Héritier's plant was collected in the Jardin des Plantes in Paris from seed originally sent from Buenos Aires, Argentina. The British Museum specimen, from Africa, is clearly Lippia javanica.

Additional citations: TANGANYIKA: M. Richards 25292 (Mu); Schlieben 319 (Mu). ZANZIBAR: Frazier 2293 (W-2810848). KENYA: Maas-Geesteranus 5210 (Go), 6364 (Go); Mwangangi & Abdalla 261 (Mu); Strid 3470 (Go). RHODESIA: Dehn 53 (Mu); Norlindh & Weimarck 4245 (Mu, N). MOZAMBIQUE: Lourenzo Marques: Junod 2861 (Mu, W-2646107); Marques 2447 (Mu); F. A. Mendonça 1645 (Ld); E. Sousa 157 (Ld). NIASSA: Stolz 351 (Mu-4271). NAMIBIA: Baum 250 (Mu-3918). SWAZILAND: Kemp 665 (W-2781812). SOUTH AFRICA: Cape Province: Bayliss BS.6251 (Mu); Collector undetermined s.n. [Mo.

Bot. Gard. photo A.865] (N—photo); Ecklon s.n. [Cap. b. sp.] (Mu); Krause s.n. [Natal Bay] (Mu); Krook s.n. [Penther 1792] (Mu—4072); B. E. Martin 916 (Mu); L. E. Taylor 2817 (N). Natal: Meebold 12831 (Mu), 12832 (Mu); Rudatis 618 (Mu—4272); Wells 1121 (Mu). Transvaal: Bos 1243 (Mu); Codd 6554 (Ba); Dyer 3960 (Oa); Rau & Schlieben 9637 (Mu); Rodin 3871 (Ba); Scheepers 126 (Mu); Schweickerdt 1222 (Mu); Schlieben 7011a (Mu), 8299 (Mu); Wasserfall 909 (N); Werdermann & Oberdieck 1807 (W—2583124), 2111 (W—2583182). CULTIVATED: France: Herb. Kummer s.n. [Ex horto Parisii 1834] (Mu—1192); Thouin s.n. [Ex horto Parisii] (Mu—9). Germany: Bouché s.n. [Herb. Willdenow 11512; Mus. Bot. Berol. film 1474/1 & 1474/2] (Z—photo, Z—photo); Herb. Martius s.n. [cult. 1820] (Mu—482); Herb. Schrank s.n. (Mu—11); Herb. Schreber s.n. (Mu—8); Herb. Schwägrichen s.n. (Mu—1540); Herb. Zuccarini s.n. [h. b. M. 1820] (Mu—13). LOCALITY OF COLLECTION UNDETERMINED: Martius s.n. [Salgado, "Minas Gerais, Brazil"] (Mu—10).

LIPPIA JUNEILLIANA (Moldenke) Troncoso

Additional bibliography: Cabrera, Bol. Soc. Argent. Bot. 5: 96. 1953; Hocking, Excerpt. Bot. A.11: 103. 1967; Moldenke, Phytologia 14: 409. 1967; Moldenke, Fifth Summ. 1: 198 (1971) and 2: 540, 553, 558, & 892. 1971; Hegnauer, Chemotax. Pfl. 6 [Chem. Reihe 21]: 668. 1873; Troncoso, Darwiniana 18: 338 & 410. 1974.

Troncoso (1974) lists this species from Córdoba, La Rioja, and Tucumán. The Pierotti s.n., cited below, is a mixture with something non-verbenaceous.

Additional citations: ARGENTINA: Córdoba: Burkart 18979 (Ac, W—2568005); L. S. Smith Arg.19 (Ld); Sota 734 (N); Stuckert 6707 (W—2595173). Salta: Aguilar 233 (N). San Luis: Báez 6 (W—2567983); Burkart 13960 (W—2595164); Varela 642 (N). Santiago del Estero: Pierotti s.n. [9/IV/1944] (Ut—3305778). Tucumán: Stuckert 9419 (N).

LIPPIA KITUIENSIS Vatke

Additional bibliography: J. G. Baker in Thiselt.-Dyer, Fl. Trop. Afr. 5: 276. 1900; Glover, Prov. Check List Brit. & Ital. Somal. 268. 1947; Dale & Greenway, Kenya Trees 588. 1961; Moldenke, Phytologia 12: 237—238. 1965; Moldenke, Fifth Summ. 1: 230 & 241 (1971) and 2: 557 & 892. 1971.

Baker (1900) lists Lippia kituiensis as a questionable synonym of Lantana salvifolia Jacq.; Glover (1947) lists it as a questionable synonym of Lantana rugosa Thunb.; Dale & Greenway (1961) reduce it to synonymy under Lippia ukambensis Vatke.

Additional citations: KENYA: Hildebrandt 2738 (Mu—1479— iso-type, Z—iso-type).

[to be continued]